

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

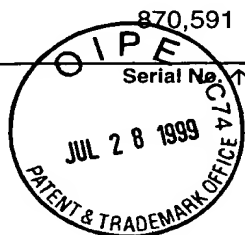
Re: Appeal to the Board of Patent Appeals and Interferences

PATENT APPLICATION

In re **PATENT APPLICATION** of
Inventor(s): **ESCH et al.**
Appln. No.: **08**

Group Art Unit: **1754**
Examiner.: **Hendrickson**
Atty. Dkt. **238397** **93 200 FH**
PMS

Series Code ↑
Filed: June 6, 1997
Title: **PRECIPITATED SILICAS**



M# **21123** Client Ref **238397**
(Our Deposit Account No. 03-3975)
(Our Order No. **21123** **238397**)
C# M#

Date: July 28, 1999

Asst. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

1. ☐ **NOTICE OF APPEAL:** Applicant hereby appeals to the Board of Patent Appeals and Interferences from the decision (not Advisory Action) dated _____ of the Examiner twice/finally rejecting claim(s) in this application or in this application and its parent application.
2. ☒ **BRIEF** on appeal in this application attached in triplicate.
3. ☐ An **ORAL HEARING** is respectfully requested under Rule 194 (due two months after Examiner's Answer- unextendable)
4. ☐ Reply Brief is attached in triplicate (due two months after Examiner's Answer – unextendable).
5. ☐ "Small entity" verified statement filed: ☐ herewith. ☐ previously.

6. FEE CALCULATION

	Large/Small Entity	Fee Code
If box 1 above is X'd, see box 12 below first and decide: enter	\$300/150*	\$ 119/219
If box 2 above is X'd, see box 12 below first and decide: enter	\$300/150*	\$300 120/220
If box 3 above is X'd, see box 12 below first and decide: enter	\$260/130*	\$ 121/221
If box 4 above is X'd, enter nothing	- 0 - (no fee)	
7. Original due date: MAY 30, 1999		
8. Petition is hereby made to extend the original due date to (1 mo) \$110/\$55 115/215		
cover the date this response is filed for which the requisite fee (2 mos) \$380/\$190 116/216		
is attached. (3 mos) \$870/\$435 117/217		
(4 mos) \$1360/\$680 +380 118/218		
9. Enter any previous extension fee paid <input type="checkbox"/> previously since above original due date (item 7); <input type="checkbox"/> with concurrently filed amendment	-0	
10. Subtract line 9 from line 8 and enter: Total Extension Fee	+380	
11. TOTAL FEE ATTACHED =	\$680	

12. ☐ *Fee NOT required if/since paid in prior appeal in which the Board of Patent Appeals and Interferences did not render a decision on the merits.

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown in the heading hereof, for which purpose a duplicate copy of this sheet is attached. This **CHARGE STATEMENT** does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.

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NOTE: File this cover sheet in duplicate with PTO receipt (PAT-103A) and attachments

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of

ESCH et al.

Appln. No.: 08/870,591

Filed: June 6, 1997

FOR: PRECIPITATED SILICAS



Group Art Unit: 1754

Examiner: Hendrickson

* * * * *

July 28, 1999

APPEAL BRIEF

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

Appellants submit herewith their Appeal Brief in triplicate as required by 37 C.F.R. 1.192(a). A Notice of Appeal was filed March 30, 1999, and the due date for submission is extended by petition and fee submitted herewith.

REAL PARTY IN INTEREST

The real party in interest is DEGUSSA AKTIENGESELLSCHAFT, by virtue of assignment from Appellants.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences which will directly affect, or be directly affected by, the Board's decision herein.

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STATUS OF CLAIMS:

Claims 1 and 7 have been finally rejected by the Examiner and are at issue in this appeal. The claims on appeal are set forth in the Appendix to this brief.

STATUS OF AMENDMENTS:

No amendments have been submitted subsequent to the Examiner's final rejection of December 30, 1998.

SUMMARY OF THE INVENTION:

The invention is a precipitated silica having unique physico-chemical properties. In particular, the silica of the invention has a BET surface area between 35 and 350 m²/g, a BET/CTAB surface area ratio of 0.8 to 1.1, a pore volume(PV) between 1.6 and 3.4 ml/g, a silanol group density of 6 to 20 ml, an average aggregate size of 250 to 1500 nm, a CTAB surface area of 30 to 350 m²/g, a DBP value of 150 to 300 ml/100 g, V_2/V_1 by Hg porosimetry between 0.19 and 0.46, and a DBP/CTAB ratio of 1.2 to 3.5. In a preferred embodiment the DBP/CTAB ratio of the silica is between 1.2 and 2.4. The silica has very good microdispersion and is useful for preparation of superior vulcanizable rubber compounds, particularly useful for rubber tires.

ISSUES:

1. Whether the Examiner's rejection of claims 1 and 7 under 35 U.S.C. § 112, second paragraph, as being indefinite, should be reversed.

2. Whether the Examiner's rejection of claims 1 and 7 under 35 USC § 103, as being unpatentable over Lagarde et al. (U.S. Pat. No. 4,704,425) should be reversed.

3. Whether the Examiner's rejection of claims 1 and 7 under 35 USC § 102(b) or § 103 as being anticipated by or obvious over Johnson et al. (U.S. Pat. No. 4,681,750) should be reversed.

GROUPING OF THE CLAIMS:

The claims stand or fall together.

THE EXAMINER'S POSITION:

1. It is the Examiner's position that claims 1 and 7 are indefinite in the following recitations:

- a. The recitation in claim 1 "ml ... pH of 7" [*sic*].
- b. The recitation of V_1 and V_2 .

2. It is the Examiner's position that claims 1 and 7 are obvious over Lagarde et al. because Lagarde et al. teach a silica having similar BET and CTAB values and that the other properties of Appellants' invention are deemed inherent in the product of Lagarde et al.

3. It is the Examiner's position that claims 1 and 7 are anticipated by or obvious over Johnson et al. because Johnson et al. teach a silica having a BET in the claimed range that is made in a manner substantially the same as Appellants' invention.

ARGUMENT:

1. Appellants submit that the 35 U.S.C. § 112, second paragraph rejection should be reversed for the following reasons.

a. The recitation in claim 1 "ml of NaOH consumed in raising pH to 9" is a common means in the art of expressing silanol group density, as also recited in claim 1. It is respectfully submitted that the meaning of this recitation will be understood by those skilled in the art from reading the claim. The value indicated by this expression is determined from the Sears number and signifies a consumption of NaOH from a titration to a final pH of 9 and is a measure of the silanol group density of a silicic acid. This determination is known to those of skill in the art and is indicated in the present specification to be carried out according to G.W. Sears, Analyt. Chemistry 12:1982-83 (1956) (See page 2, line 20-22 of the present specification). For these reasons, it is respectfully requested that this portion of the 35 USC § 112, second paragraph rejection be reversed.

b. The meanings of V_1 and V_2 will be similarly understood to those of skill in the art. The definitions for the consumption of mercury in the mercury porosimetry (V_1 and V_2) can be found in Figure 5 of the present specification. It is indicated there that V_2 is the consumption of mercury in milliliters for the pores of 175 to 275 Å and V_1 is the consumption in milliliters of mercury for the pores < 400 Å. Accordingly, Appellants submit that the meanings of V_1 and V_2 are clear, and request that this portion of the 35 USC § 112, second paragraph rejection be reversed.

2. Appellants submit that the 35 U.S.C. § 103 rejection over Lagarde et al. should be reversed for the following reasons.

The claimed products are distinct from those of Lagarde et al. because the precipitated silicas differ with respect to their characteristics and also the uses for which they are employed.

Pending claims 1 and 7 are drawn to a distinct precipitated silica which is characterized by a $V_2:V_1$ ratio (determined with the mercury molding method) and by a DBP:CTAB ratio. These two parameters along with the other listed parameters identify a precipitated silica suitable for use in the manufacture of tires. See page 7 at lines 23-26 where the silica of the invention is used in natural rubber mixtures for tire manufacture. The tires made from rubber mixture

containing the precipitated silica of the invention exhibit considerably improved properties, e.g. a higher modulus, a lower roll resistance and a better wear resistance. These advantages and others are found on page 10, lines 16-23 of this application. In contrast, Lagarde et al. is concerned with the development of a precipitated silica as a filler material for reinforcement of organosilicic polymers. Lagarde et al. employs a different silica material to start with (see column 4, last paragraph and column 5, first two paragraphs). The silica employed in the invention results from the addition of the acid to the water glass solution in one step (see example 1). In contrast, in Lagarde et al. the acid is added to the water glass solution in several distinct steps. Appellants respectfully submit that this difference in starting material should be considered when comparing the products.

Further, the silica product of Lagarde et al. has a specified composition (see tables in column 2) and is prepared in a specified fashion which permits blocking of any micropores (see column 5, lines 1-12). The resulting product is not used to manufacture tires but rather is added to silicone rubber to form mixtures which are vulcanized. The end product specifically mentioned by Lagarde et al. is crepe rubber-soled shoes. See column 14, line 27. This silicone rubber product on its face does not appear to meet the

requirements of automobile tires in regards to wear resistance, mechanical strength and tear resistance.

Also, Lagarde et al. describes a precipitated silica which is characterized in column 2, lines 1-34 in terms of physicochemical data. Among the other listed properties, the silica of Lagarde et al. is characterized as having a sodium content which must be less than 500 ppm. The low sodium content of the precipitated silica is necessary for their product, as shown in Example 2. It can be concluded from column 2, lines 6-14 in Lagarde et al. that the precipitated silica with the low sodium content of <500 has the same reinforcing action as a pyrogenically produced silica.

Appellants note that the specific volume V_0 of Lagarde et al. has nothing in common with the claimed V_2/V_1 ratio range, which was explained above. Lagarde et al. measures only the volume which a silica occupies after a pressure load of 4 kg/cm². In contrast, the Hg porosimetry used in accordance with the invention measures macropores, placing the Hg consumption for a certain pore size (17.5 - 27.5 nm) in a ratio with a total Hg consumption for pores less than 40 nm. Accordingly, this ratio should be given weight in distinguishing the products.

As additional evidence, Appellants filed a Declaration under Rule 132 of Dr. Udo Görl dated September 4, 1997 detailing the methods and results of tests carried out

comparing the compositions of the present invention with those taught in the Lagarde et al. patent. The Board's attention is particularly directed to Table 3 of the Declaration, wherein vulcanizate data from silicas according to the present invention is compared with vulcanizate data from silicas according to the Lagarde et al. patent. The conclusions drawn from the data are set forth in paragraphs 6 and 7 of the Declaration, which state

"It is clear that the products of the invention have a markedly higher reinforcement behavior (modulus 300%) than the silicic acid from U.S. Patent 4,704,425. The products according to the invention also show advantages in DIN wear (abrasion loss). The remaining data (resistance to rupture, elongation to rupture, resistance to tear) is very heavily influenced by the modulus. Substantial advantages are seen with the compositions of the invention in respect to these characteristics."

and further

"It is clear from these comparative tests that the compositions according to the present invention are different from those of Lagarde et al., as described in U.S. Patent 4,704,425, and exhibit marked advantages over the compositions of Lagarde."

Thus, the Declaration provides additional evidence that the compositions of the present invention are different from, and exhibit marked advantages over, the compositions of Lagarde et al.

For all of the above reasons, reversal of the 35 USC § 103 rejection over Lagarde et al. is respectfully requested.

3. Appellants submit that the 35 U.S.C. § 102(b)/103

rejections over Johnson et al. should be reversed for the following reasons.

The method of production of the silica according to Johnson is quite different from the method of the present invention. In claim 1 of Johnson, it is indicated that two different pH values can be held during the precipitation in step a)-- a metal oxide concentration of from about 2.1 to 2.6 grams per liter (pH = 12.8 - 12.9) or metal oxide concentration of from about 5.6 to 7.2 grams per liter (see step b). In contrast, according to the present invention, the pH is kept constant in the range of 7.5 - 10.5.

The method of Johnson consists of several steps:

- 1) precipitation
- 2) acidification
- 3) aging the reaction mixture
- 4) acidification

In contrast, the method of the present invention has only one step--precipitation with acidification.

The solid content of the reaction mixture at the end of the precipitaion is 74 g/l SiO_2 , according to example 1 of Johnson. According to claim 2, the solid content is 90 to 120 g/l SiO_2 .

These differences show that the precipitated silicas produced by these methods are different. Johnson uses the precipitated silica as filler for battery separators (see col.

6, last line). The function of the silica is to introduce porosity into the polymeric material utilized to fabricate the battery separator (see col. 1, lines 55-60).

According to the present invention, the silica is used as a filler in rubber compositions to produce tires which have a low rolling resistance. This is possible because the silica of the present invention can be well dispersed in the rubber mixture.

Further evidence as to the differences between the compositions taught by Johnson and those of the present invention was presented in the Declaration of Dr. Udo Görl dated October 15, 1998. The Declaration sets forth the results of tests conducted to compare the properties of the presently claimed compositions with those of Johnson. The compositions were tested in a high silicic acid-filled PKU tread mixture based on L-SBR/BR (a tread compound introduced by Michelin in 1992). (It is noted for the Board's information that in Table 2 of the Declaration ("Rubber Technology") "Strength" means "Tear Strength", "Break Stretch" means "Elongation at Break" and "Break Energy" means "Energy at Break".)

As noted in paragraph 5 of the Declaration,

"Substantial advantages are seen with the composition of the invention in respect to these characteristics. This is especially clear in the strength values and in the modulus, but also in the ball rebound (corresponding to lower rolling resistance) and in the $\tan \delta$ at 0° (higher values signifying better wet skid resistance properties).

The evaluation of the dispersion using a 10-point scale (Phillips method) shows that 3380 is two steps better than LV 6589. Most of these application technology advantages are associated with the lower Sears number of the present invention, which stems from the different manner of precipitation."

Appellants respectfully submit that this clearly demonstrates the differences and unexpected advantages of the presently claimed compositions compared with those of Johnson.

For all of the above reasons, Appellants respectfully submit that the 35 USC § 102(b) and § 103 rejections over Johnson should be reversed.

CONCLUSION:

In summary, Appellants respectfully submit that

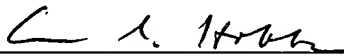
1. The language of claim 1 is clear and would be understood by those of skill in the art;
2. The claimed composition is not obvious from the teachings of Lagarde et al., having different properties and exhibiting marked advantages over the compositions of Lagarde et al.; and
3. The claimed composition is not anticipated by nor obvious from the teachings of Johnson et al., having different properties and exhibiting marked advantages over the compositions taught by Johnson et al.

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For all of the above reasons, Appellants respectfully request that the rejections be reversed and the application passed to allowance.

Respectfully submitted,

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By 
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Appendix 1:

1. Precipitated silica having the following physico-chemical properties:

BET surface area	35 to 350 m ² /g
BET/CTAB surface area ratio	0.8 to 1.1
Pore volume, PV	1.6 to 3.4 ml/g
Silanol group density, ml of NaOH consumed in raising pH to 9	6 to 20 ml
Average aggregate size	250 to 1500 nm
CTAB surface area	30 to 350 m ² /g
DBP value	150 to 300 ml/100 g
V ₂ /V ₁ by Hg porosimetry	0.19 to 0.46
DBP/CTAB	1.2 to 3.5

7. The precipitated silica according to claim 1, wherein the DBP/CTAB ratio is 1.2 to 2.4.